DOCUMENT RESUME

ED 191 004 CS 005 601

AUTHOR Vaughan, Joseph L., Jr., Ed.: Anders, Patricia L., Ed.
TITLE Research on Reading in Secondary Schools: A Semi-Annual Report: Perspectives on Reading Comprehension with Pedagogical and Research Implications. Monograph Number 4.
INSTITUTION Arizona Univ., Tucson.
PUB DATE Nov 79
NOTE 82p.: Best Copy Available.

EDRS PRICE MF01/PC04 Plus Postage.
DESCRIPTORS *Discourse Analysis: Learning Theories: *Reading Comprehension: Reading Improvement: *Reading Instruction: *Reading Processes: *Reading Research: Secondary Education: Teaching Methods

ABSTRACT

This monograph is the fourth in a series of semiannual reports of research related to reading in secondary schools. The five papers in the monograph are concerned with the pedagogical and research implications of reading comprehension. Specific topics dealt with include (1) a phenomenological perspective on the reading process, (2) the role of text in reading comprehension, (3) discourse analysis, (4) the relationship between author and reader in reading comprehension, and (5) prior knowledge and literary inference. (FL)

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RESEARCH ON READING IN SECONDARY SCHOOLS

A Semi-Annual Report

Monograph Number 4

Perspectives on Reading Comprehension with Pedagogical and Research Implications

Edited by

Joseph L. Vaughan, Jr.
Patricia L. Anders

November, 1979

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A special thanks is due to Kenneth J. Smith, Head of the Reading Department, for his support in producing this monograph. Further, we would like to thank our support staff, especially Leslie Evans and Michaela Johnson, for all their assistance in preparing this issue.

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Table of Contents

Editorial Board i

Table of Contents ii

Purchase of Monographs iii

Submission of Manuscripts iv

Section One: Perspectives on Reading Comprehension

Congruence on Philosophy and Pedagogy of Reading
Thomas H. Estes
University of Virginia. 1

Structures and Strategies in Reading Comprehension
Gary Steinley
South Dakota State University 18

Section Two: Reactions to Estes and Steinley

Some Reflections on Discourse Comprehension
P. David Pearson
Taffy E. Raphael
Center for the Study of Reading
University of Illinois 37

Author and Reader: The Communication Connection
Diane L. Schallert
University of Texas

Sherry C. Vaughan
University of Arizona 49

Prior Knowledge and Literary Inference: A Response to Estes and Steinley
Richard Beach
University of Minnesota 57

Future Issues 75

PURCHASE OF MONOGRAPH

This monograph is the fourth in a series of semi-annual reports of research related to reading in secondary schools. This monograph has been funded by the Reading Department of the University of Arizona for the primary purpose of disseminating research findings to professionals in reading who are interested in improving the reading ability of adolescents.

The first issue of this monograph series was published in April, 1978, and may be obtained for $2.50. Subsequent issues, including the current issue, are available at a cost of $3.50. Checks should be made payable to Reading Research Monograph and forwarded to the University of Arizona, Tucson, Arizona 85721.

If you are interested in back copies, please use the order form provided on the next page. Future issues are described on page 75 of this volume.

SUBMISSION OF MANUSCRIPTS

This monograph series is planned and published as a non-profit enterprise by faculty and doctoral students in the Reading Department at the University of Arizona. Each article submitted is independently reviewed by at least three members of the editorial board. Subsequent issues are planned that will include specific research studies, theoretical papers that emphasize a need for research, and additional reviews of literature. Articles that deal with any of these areas are being actively solicited if they (1) are of interest to reading professionals on the secondary level, (2) are primarily directed to research, and (3) have not previously been published elsewhere.

One unique aspect of this series is that the editorial board is particularly interested in receiving papers from doctoral students and from assistant professors. It is our belief that many of the professionals in these categories do not publish their research findings because of a perceived and existing difficulty "breaking into the publishing game." We hope to encourage "first-time" authors by providing such an opportunity and encourage such prospective authors to submit papers or questions to the editors.

The response to our effort has been most gratifying. As you may well appreciate, the production and dissemination of a new publication is hardly an easy task. In fact, as we succeed, the task becomes increasingly more complex. Our future success depends upon the degree to which our colleagues join us in generating research and in reporting their findings.

J.L.V.
P.L.A.

CONGRUENCE IN PHILOSOPHY AND PEDAGOGY OF READING

Thomas H. Estes
University of Virginia

In Philosophical Investigations (1953, p.8), Ludwig Wittgenstein, perhaps the outstanding philosopher of the twentieth century, said, "To imagine a language means to imagine a form of life." To read is to participate in a form of life, and from this two important implications result. One is that it is in principle impossible that anything other than a human being could experience the event of reading. A computer reads cards if they have not been folded, stapled, or mutilated. A pigeon reads colored discs to ascertain the location of pieces of corn. A thermostat reads the temperature of the room in order to keep us comfortable. A child reads a book and laughs or cries. But the word "read" is being used in very different ways here. When the computer and the pigeon and the thermostat "read," they are not doing anything like what the child is doing, like what you are doing right now. They do not participate in our form of life. Do not assume that different uses of the same word must have something in common, a shared meaning which is their essence. As Wittgenstein cautions, "Don't say: 'There must be something common or they would not all be called (by the same name)--but look and see whether there is anything common to all (p.31).'" Our language deceives us at times, makes us assume what is not so. "Philosophy is a battle against the bewitchment of our intelligence by means of language (p. 47)."

The second implication follows from the first. Whatever we do to teach reading should be firmly based in our convictions about the nature and dignity of human beings. For my own part, and this idea by no means

enjoys universal acceptance (cf. Skinner, Beyond Freedom and Dignity, 1971), human beings have judgment, they have free will, they have complex emotions. Their form of life is so infinitely complex that, like infinity, it is generally taken for granted. We are probably not much closer to understanding it than we were 3,000 years ago. Perhaps because of this, many people, and not just psychologists and educators, have in George Miller's (1972) words, "come to take for granted...that men and computers are merely two different species of a more abstract genus called information processing systems." The idea of reading as information processing is appealing, people are attracted to the computer metaphor as an explanation of thinking. But, as Ulric Neisser points out in his book, Cognition and Reality (1976). "the study of information processing has not yet committed itself to any conception of human nature that could apply beyond the confines of the laboratory. And within that laboratory, its basic assumptions go little further than the computer model to which it owes its existence (p. 6)."

The major problem confronting us in the study of reading is that the model of reading on which most pedagogy is based is incongruent with our basic notions of what it means to be a human being. The prevailing view is that reading is a skills-determined linear process, schematically represented by Figure 1. The reader is exposed to text, something to read. He or she discovers information or meaning in the text by processes such as decoding, recognizing the main idea, visualizing, finding details, etc. Next, the reader processes information in some way or another which leads to understanding and storage. Last, and this is the

crucial step, the reader can retrieve the information, or "true and literal meaning" of the text, in approximately the same form as it appeared. Any interpretations are to be justified with reference to this meaning. (Surely if a computer could read, as in "The child read the book," we would describe its activity in terms similar to these.)

Insert Figure 1 here

There are two important pedagogical implications of this view. First, it is reading skills which determine comprehension and, second, those skills are susceptible to direct instruction irrespective of text. According to this model, the criterion of success is retrieval of information. Input, processing, retrieval; call this the computer model of reading. The teacher's job is to program the right skills into the machine as directed by the manual, with every comma and every period in exactly the right place.

The issue here is whether we are to base our pedagogy on what computers can do or in what we understand about human beings. The computer (on which most models of linguistic behavior are based) cannot participate with human beings in their form of life, and hence whatever a computer can be made to do has, in the words of Joseph Weizenbaum (1976), "only the faintest relation to human understanding and human intelligence (p. 213)." As he argues, there is an infinite difference between computer power and human reason, between calculation and judgment. The fact that computers cannot read or engage with us in any linguistic behavior is not a technological problem; it is in principle an impossibility.

I would like to propose that reading is not a linear process at all but rather a cyclic activity, typical of the way in which human beings try to understand. What I propose in Figure 2 is derived from Ulric Neisser's (1976) diagram of the cyclic nature of perception. The assumption is that comprehension is an activity of which perception is an aspect and that reading comprehension is an instance of the general tendency of human beings to be affected by and to affect the world in which they live.

Insert Figure 2 here

I am proposing that a more appropriate view of reading would suggest a process which is cyclic and synergistic rather than linear. The term synergistic is borrowed from biology where it is used to refer to the action of two or more organs to achieve an effect of which each is individually incapable. The "parts" of the reading process form a synergistic interaction, but the whole precedes the parts. Reading is an interaction of the content of what is read, the person who is reading it, and the strategies employed for the purpose of reading. It is the interaction rather than the parts which constitute the process.

The "text" may be of many different kinds--stories, fables, novels, essays, expositions, summaries, poems, plays, programs, schedules, calendars. And whatever the kind, text is read in context, always a part of something larger than itself, always in a situation wherein the reader also exists. Some, like Stanley Fish (1970), have gone so far as to suggest that it is this context, of which the reader and what is read are a

part, that determines the meaning of what is read. In Fish's terms, "meaning is an event," it is something that happens to the reader as a result of reading. (Fish distinguishes meaning, something which happens to the reader, from information, the content of text.) It might be added that text is always more or less appropriate with respect to the needs, interests, and abilities of the reader. Such considerations will determine the meaning of what is read, i.e., the effect of what is read on the person reading. Notice how much of this is susceptible to influence through instruction. Students' needs, interests, and abilities are exactly the points of focus we should have in teaching.

The ideas of cognition, volition, and affect are similar to what I earlier referred to as judgment, will, and emotion. These are subsidiary ideas to the notion of mind, which Jerome Shafer, professor of philosophy at the University of Connecticut and executive secretary of the Carnegie-supported Council for Philosophical Studies, once referred to as "convergences of large numbers of neutral phenomena" (1968, p. 7). These phenomena are in principle impossible to list but we can get some idea of how the nature of mind relates to reading by citing and categorizing examples of the sorts of phenomena one might need reference to in an explanation of reading. Cognition includes thought and belief, understanding, imagining, remembering, knowing how and knowing that. Affect includes sensations, feelings, emotions, moods, frames of mind. Volition includes desires, motives, decisions, intentions, trying, behavior traits. All of which overlap, crisscross, and interrelate in myriad ways to define every individual. Another way of labeling this

point in the diagram would be to call it what the reader is, determined by his or her experience, which is constantly changing, partly as a result of reading. Paradoxically, it is what the reader is that determines the meaning of experiences like reading and yet it is the experiences (combined with factors of maturity and genetic endowment) that determine what the reader is. Text and reader exist in a context of which each is a part, and they affect one another.

I am advancing a phenomenological perspective on the reading process, the foundation of which is found in the school of literary criticism known as "reception aesthetics" (Leitch, 1977). It is not my purpose to explain this in any depth here, but I believe the following quote from Wolfgang Iser (1974), the leading European member of the school, adequately summarizes the perspective:

> The literary work has two poles, which we might call the artistic and the aesthetic: The artistic refers to the text created by the author, and the aesthetic to the realization created by the reader. From this polarity it follows that the literary work cannot be completely identical with the text, or with the realization of the text, but in fact must lie halfway between the two.... The convergence of text and reader brings the literary work into existence, and this convergence can never be precisely pinpointed, but must always remain virtual, as it is not to be identified either with the reality of the text or with the individual disposition of the reader (p. 125).

It is worth noting here that the most common alternative view treats reading comprehension as primarily a cognitive phenomenon by which readers comprehend meaning which exists in the text. We have commonly looked at changes in understanding, remembering, or knowing (we might call it reduction of uncertainty, after Frank Smith) as the definientia of comprehension. But one could as easily argue that comprehension is essentially an affective phenomenon which is merely evidenced in cognitive or volitional changes, changes in what the reader knows or is inclined to do. It was Bartlett, in 1932, who made the point that "when a subject is being asked to remember (from reading), very often the first thing that emerges is something of the nature of attitude. The recall is then a construction, made largely on the basis of this attitude, and its general effect is that of a justification of the attitude (p. 207)."

Bartlett also happens to be the first psychologist to make use of the term schema, currently being defined as "abstract symbolic representations of knowledge which we express and describe in language, but which are nevertheless not themselves linguistic (Rumelhart & Ortony, 1977, p. 111)." It would be inappropriate here to launch a full scale discussion or criticism of schema theory. Suffice it to say that the current most popular definition of comprehension is "the process of selecting and verifying conceptual schemata to account for the situation (or text) to be understood (Rumelhart, 1977, p. 268)." Selection and verification (and this is my point in mentioning schema theory) are undoubtedly affected by and affect cognition, volition, and affect. Our understanding of the reading act, even from the perspective of schema

theory, will depend on our realization that it is the nature of human beings which determines the nature and results of reading and of the meaning of what is read.

Modification of schemata, of cognition, volition, and affect, is the result of comprehension. (The actual process of comprehension may not be formalizable, even in principle.) It is important to note, however, that once set in motion, the change may continue endlessly. When will those of us who were deeply moved by it ever stop understanding Thoreau's Walden? Not only is the meaning of such a book different for us each time we read it (because we are different human beings in a different context each time), but the meaning of a single reading, the effect it has, changes and continues for all our life. We reflect on such an event as Walden, it comes to mind in different situations to lend perspective and to change in perspective. Part of what it means to be a human being is that our comprehension is not static, is better described as a stage than as a state. We are continuously rather than momentarily affected, though naturally more strongly by some things we read than by others, and that effect is what I want to call comprehension. It could only happen to a human being.

There is one more piece to the puzzle suggested by Figure 2. Reading is something people do; it is the employment of strategies in an effort to cause meaning. More accurately, the interaction of text and reader in a context is mediated by reading strategies, or explorations on the part of the reader. The idea of the cycle is critical. What we are determines what we expect and that directs us to sample certain information through exploration, confirming or disconfirming our expectations. The

effect is to modify what we are and thus what we are cognitively, volitionally, and affectively capable of expecting...and so on, continuously and simultaneously.

There are many things which might make the proposed view appealing, not least that it tends to elevate the importance of the individual, to dignify the place of the human being in the event of reading. But many of its implications are less idealistic, more immediately applicable. The linear skills model alternative implies much about testing, little about teaching. Quite the contrary with the cyclic view which moves us away from a normative or psychometric perspective and, I think, toward a pedagogical perspective. I will list two general and ten specific, important pedagogical implications as cases in point.

First, I think it is implied that what we do in teaching people to read must derive from consideration of the nature of the text they are being asked to read in relation to their understandings, inclinations, and attitudes as well as the reading strategies of which they are capable. Second, and this is also a general implication which I quote from Frank Smith (1973), "learning to read is a complex and delicate task in which almost all the rules, all the cues, and all the feedback can be obtained only through the process of reading itself. Children learn to read only by reading (p. 195)," and the reason is related to the cyclic and synergistic nature of the process. Reading strategies, like most human behaviors, do not develop in isolation from their use.

I would mention these specific implications:

(1) Text of meaningful content, of appropriate difficulty and interest to the reader, is an imperative necessity for teaching reading. Anything we might ask someone to read in hopes of becoming a better reader must have a high potential for affecting the reader. That is no more than to say that text must be potentially meaningful if it is to serve any purpose for the reader.

(2) The process of learning to read continues throughout life when that life is filled with reading. It is never true that at some life stage the person is learning to read whereas at some other stage he is reading to learn. We might rather liberally interpret "to learn" here to mean "to be affected." The child of eighteen months, the kindergartener, the third grader, the adolescent, the adult all become more capable readers as a result of the effect which reading has on them.

(3) The content under study in subject areas like science, math, social studies, driver education, home economics, etc., is logically and practically ideal for teaching reading. The objectives of content area study and of reading instruction can be achieved simultaneously without conflict or sacrifice.

(4) The teaching of reading in any setting can become the facilitation of learning through reading, an approach which will simultaneously augment the reader's understanding and his ability to read. In reading class this occurs where the reading is centered on themes of general interest to the students. In content areas it occurs when reading is part of a learning environment where each student is allowed to come to individually better understanding of specific concepts around which all learning activities are focused.

vities are focused. In both cases it is the teacher's job to orchestrate the environment to maximize the possibility of learning by all students. Reading can and should be a vital part of that environment.

(5) The best way to facilitate learning through reading is to affect what the reader knows, how he feels about the specific learning task, and what he is inclined to do about it. This would amount to raising the reader's consciousness of what he already knows relative to the content of what is to be read or giving him necessary background information for what is to be read. A proper interest and positive inclination toward learning is crucial to the success of any reading task.

In his recent book, The Philosophy of Composition (1977), E. D. Hirsh, Jr., introduces the concept of relative readability, the potential value of the text in relation to the time and effort it requires of the reader. The facilitation of reading through learning, as I am suggesting it, would raise the relative readability of the text by decreasing the time and effort required by the reader.

(6) The reader must come to appreciate the relationship and intersection between what he or she knows and what is in the text. Too often, readers must feel as if what they are or are interested in is of minor importance in relation to the meaning of the text. Quite the opposite. Surely the reader is infinitely more important than anything he or she might read. Readers of any age deserve to feel that importance.

(7) Teachers can and should suggest and model strategies which are appropriate to particular text. For example:

a) Varying speed to suit purposes such as skimming for the general idea or reading for detail.

b) Taking notes, writing summaries, and other so-called "study skills." (This can easily be done with a group with the use of an overhead projector.)

c) Using the writer's organization pattern as an aid in organizing memory.

d) Making use of memory devices such as object association or other mnemonics.

e) Using concepts to make sense of details.

(8) Schools should provide much opportunity for reading, not relegating it to homework or limiting it to reading circle time. There is nothing more important to success in learning to read than the opportunity to succeed in the attempt to read. If this doesn't happen in school, it won't happen at all for many students.

(9) Students need at least as much time to reflect and interact as to read. In Piaget's terms, accommodation takes as much effort as assimilation. Accommodation, in terms used earlier, is the modification of schemata, the effect of reading, whereas assimilation is the exploration and sampling of information in the text. Comprehension is initiated by reading. It continues beyond the specific act when it is stimulated in reflection and interaction with others.

(10) The final implication I will mention may find little acceptance in some quarters, but it is critically important. The result of reading, comprehension, may not be testable by any of the standard tests commonly employed. The corollary is that any normative view of reading (high agree-

ment in response to questions = comprehension) can have little if anything to say about how or whether comprehension occurs or how to facilitate it.

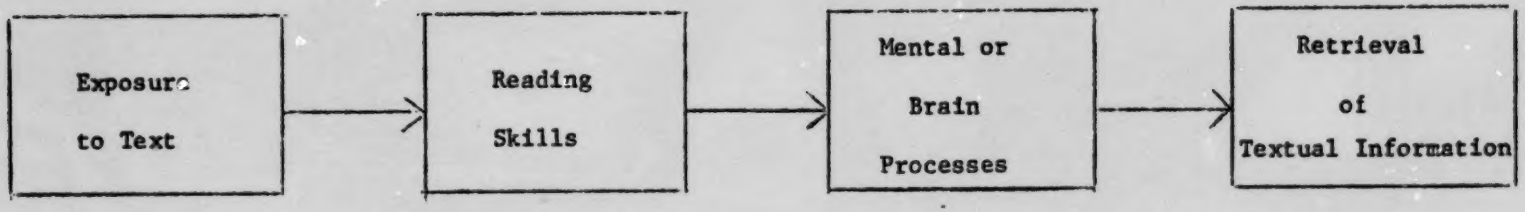

Figure 1:

Reading as a Skills-Determined Linear Process

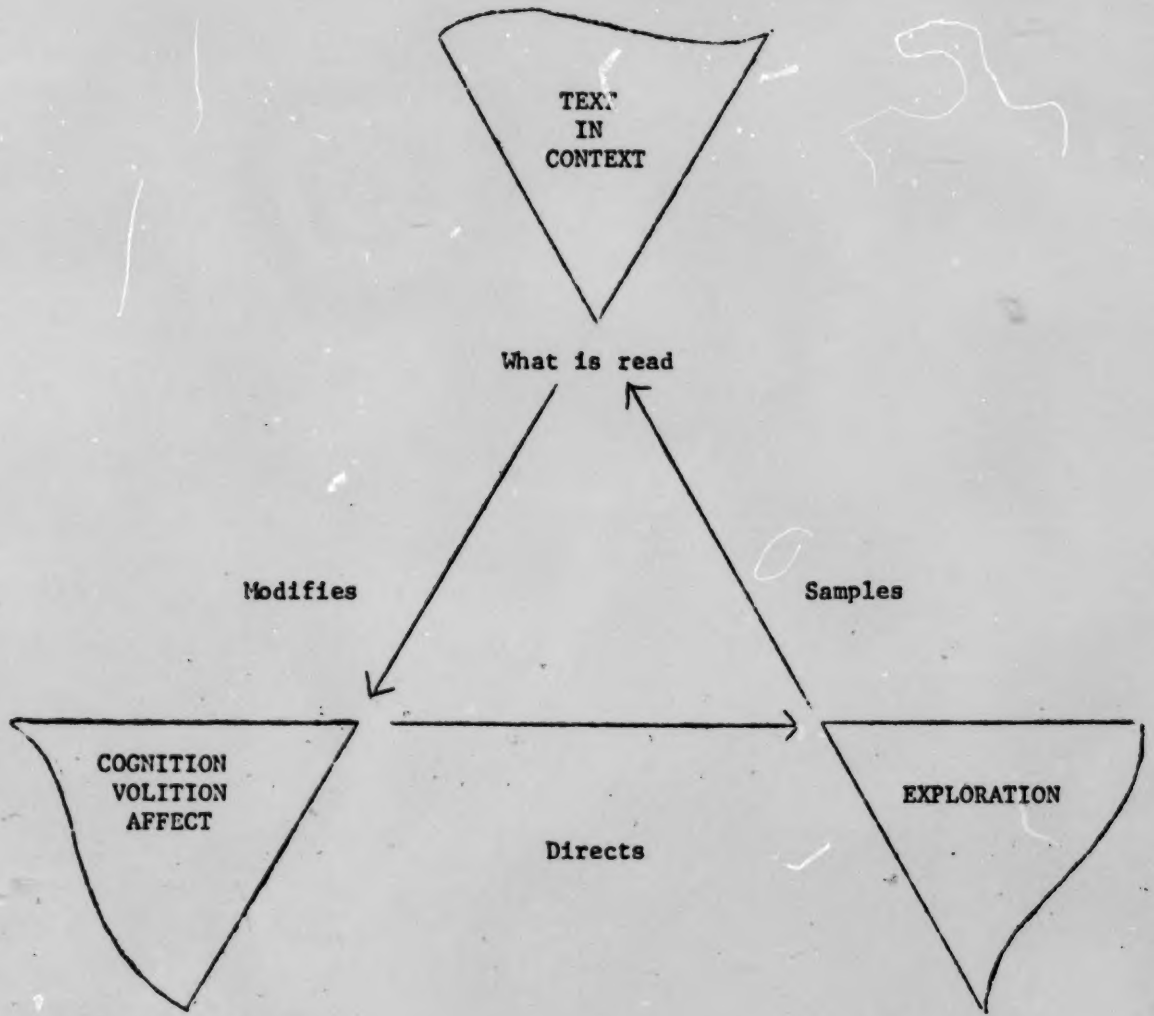

Figure 2:

A cyclic model of reading behavior (after Neisser, 1976)

References

Bartlett, F. C. Remembering: A Study in Experimental and Social Psychology. Cambridge University, 1932.

Fish, S. Literature in the reader: Affective stylistics. New Literary History, 1970, 2, 123-162.

Hirsh, E. D., Jr. The Philosophy of Composition. Chicago: University of Chicago, 1977.

Iser, W. The reading process: A phenomenological approach. In R. Cohen (Ed.), New Directions in Literary History. Baltimore: Johns Hopkins University, 1974. pp. 125-145.

Leitch, V. B. A primer of recent critical theories. College English, 1977, 39, 128-152.

Miller, G. A. Language, learning, and models of the mind. Unpublished manuscript, 1972. Cited by J. Weizenbaum, Computer Power and Human Reason. San Francisco: W. H. Freeman, 1976, p. 158.

Neisser, U. Cognition and Reality. San Francisco: W. H. Freeman, 1976.

Rumelhart, D. E. & Ortony, A. The representation of knowledge in memory. In R. C. Anderson, R. J. Spiro, and W. E. Montague (Eds.), Schooling and the Acquisition of Knowledge. Hillsdale, N.J.: Lawrence Erlbaum, 1977, pp. 99-135.

Rumelhart, D. E. Understanding and summarizing brief stories. In LaBerge, D. & Samuels, S. J. Basic Processes in Reading: Perception and Comprehension. Hillsdale, N.J.: Lawrence Erlbaum, 1977, pp. 265-303.

Shafer, J. A. Philosophy of Mind. Englewood Cliffs, N.J.: Prentice-Hall, 1968.

References (continued)

Skinner, B. F. Beyond Freedom and Dignity. New York: Bantam Books, 1971.

Smith, F. Twelve easy ways to make learning to read difficult. In F. Smith (Ed.), Psycholinguistics and Reading. New York: Holt, 1973, pp. 183-196.

Wittgenstein, Ludwig, Philosophical Investigations. New York: Macmillan, 1953.

Weizenbaum, J. Computer Power and Human Reason. San Francisco: Wild, Freeman, 1976.

Structures and Strategies in Reading Comprehension

Gary Steinley
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This paper is intended for teachers, researchers, and theorists interested in reading at the secondary level, especially those who believe secondary reading and literature instruction have a hand-in-glove relationship. It originated from a small group of South Dakota English teachers who met during the summer of 1978 as part of the state Right-to-Read effort to promote 7-12 reading. We had a specific task within that larger effort. We were to consider the implications of recent ideas on reading comprehension for the 7-12 literature classroom. More specifically, we were to address how these ideas might be incorporated into the classroom in order to (a) teach literature better and (b) reinforce and enhance students' comprehending abilities.

As a preliminary step toward that task, we spent a considerable amount of time on the following activities:

--We read and discussed a variety of theoretical papers on reading comprehension, especially papers from a psycholinguistic-schemata paradigm.

--We read different kinds of texts (cems, essays and short stories from adolescent and adult selections)

and used our reading as a basis from which to discuss our own comprehending processes.

--We discussed the nature of our students' comprehending and comprehensions as inferred from what they had said and written in our classrooms.

The purpose of these activities was to help us better understand the process of comprehension before being directly concerned with the day-to-day world of the literature classroom. We wanted to use three sources of information (current theory and research, our own introspections and intuitions, and our observations of other comprehenders) to construct a model which would represent our understanding of comprehension and which, finally, would help us better understand how we might more successfully integrate the teaching of literature with the building of comprehending abilities.

The purpose of this paper is to report an unsought finding which emerged while we were pursuing these preliminary activities. In brief, we found a conflict between one aspect of contemporary theory, the accepted notion of structures, and our own intuitions and observations. In responding to this conflict, we eventually arrived at conclusions which more closely correspond with our own experiences in reading comprehension--and which seem to have significant classroom implications.

Structures in Contemporary Theory

In contemporary models of reading comprehension, it is assumed that a structure of semantic relationships underlies any piece of connected discourse. This structure is not to be confused with other possible structures associated with texts, such as those at the word or syntactic levels. This structure underlies these and is intrinsically bound to meaning rather than form or expression. In addition, it is assumed that the meanings which readers construct to account for texts are structured. Anderson (1977) writes, "To comprehend a message is to place a construction upon it which gives a coherent formulation of its contents." (p. 4). For us, that statement summarizes what is being said in many ways: the reader builds a "construction," a mental concept which not only permits an understanding of marks on a page, but also represents that understanding. This construction becomes for that reader the meaning of that message. Moreover, this meaning is never considered just a concept or main idea, it is instead a holistic system of components and relationships. It is a structure.

Both structures are assumed. (In this paper, the first shall be referred to as "text structure," the second as "meaning structure.") But to be more specific, what kind of structures are they assumed to be?

We believe the answer is hierarchical. In fact, in studies and discussions of reading comprehension, it seems that whenever any structure is presented, it is presented in hierarchical terms. Different visual devices are used to depict these hierarchies--systems of indentations,

numbering systems, networks, branching diagrams, inverted trees--and even when such visuals are not employed (in a list of propositions, for example), the characteristics of hierarchy still dominate the descriptions. It is assumed that units are grouped in a stratified system of levels ranging from a low degree of importance and/or abstraction to a higher degree, and that the entire system is organized about some overarching principle which determines the subordinate, coordinate, and superordinate relationships among the units. This pervasiveness of hierarchy is readily evident in studies today. For example, Meyer (1975) lists propositions in a simple outline form, a tree on its side. Rumelhart (1975) depicts both syntactic and semantic structures with branching diagrams generated from rewrite rules. Frederiksen (1975) uses an inverted tree to describe two underlying networks (semantic and logical) of a text. Holland (1968) represents "the transformation of a normally unconscious fantasy toward conscious intellectual meaning" (p. 90) as hierarchical on both sides of his actual text.

And the list could easily go on. The point is that the concept of hierarchy pervades. Indeed it represents an assumption hardly questioned, not only in comprehension research but other areas as well. In an important essay on the composing process, Young (1976) writes: "Although it is impossible to prove that all complex systems are hierarchically structured, human beings appear to be incapable of understanding any other kind of system. The concept of hierarchy thus must be regarded as funda-

mental to any inquiry procedure" (p. 33).

Personal Experiences in Reading Comprehension

In our survey of the literature, we were led to the conclusion that text and meaning structures are assumed to be hierarchical in nature. But as we introspected our own comprehending and discussed that of our students, we began to question this assumption.

The questions began to emerge as we read and discussed our comprehending of a variety of texts. We read, for example, two very different stories from the New Yorker. (Side by side excerpts are included below to provide a sense of their differences.)

"He led me to where his mother was sitting. She appeared to be in her mid-thirties, plump, but with a pretty face...I said hello and she smiled and replied in French."

("The Bus" by Issac Bashevis Singer, in Aug. 28, 1978 issue.)

_____ How does it end?

_____ It doesn't end.

_____ Is there help coming?

_____ I called that number and they said whom the Lord loveth he chasteneth.

_____ Where is love?

_____ In the new music.

("The New Music" by Donald Barthelme, in June 19, 1978 issue.)

Our understanding of the Singer text was easy to discuss. Actions grouped into sequences, and plot and character were organized about a unifying theme. The Barthelme text was not so easy. Both coming to

comprehend it and the comprehension we achieved were fundamentally different from those of the Singer text. It was necessary, we soon discovered, to discuss it in terms different from those of the first discussion.

Our questions increased as we discussed what we had observed in our students (and our views of ourselves as students). Recollections like the ones below epitomize the nature of these observations:

-"I remember when I read Sound and Fury in college. Loved it. Then we had to follow Jay's study guide. Put all of the events in chronological order, etc. The same thing we did with Ulysses. My question then was why. His answer was to help us understand it. But I already understood it!"

-"Frost's poetry is no more preparation for reading Haiku than reading recipes to understand the imagists."

-"My kids understood Catch-22 (the movie) better than I did. And they read through Slaughter House Five without being bothered by his telegraphic technique. I should reread Robbe-Grillet's Jealousy now. I think I've learned from my kids how to understand it."

-"I think it's stupid in anthologies. They put Emerson's essays next to ones by Bacon or Cleaver."

The thread which unifies these observations is that it was not the comprehension of difficult texts which was the problem, it was the comprehension of different texts.

This distinction between difficult and different became significant to us. Comprehending a Sartre novel is difficult, but it can be comprehended in much the same way as something as simple as The Pearl. On the other hand, comprehending Robbe-Grillet's (Sartre's contemporary) Jealousy is entirely different. It's not necessarily difficult, but it must be read differently and different things must be sought. Similarly, Emerson and Bacon both write essays, but their essays are different in kind. In fact, not only are the essays different in kind, their comprehension seem to require almost entirely different kinds of thinking. A similar set of differences exists between Frost's poetry and Haiku--differences in kind and kind of thinking. Trying to read one kind as if it were another leads to frustration and forced "understandings," feelings we all could recall from our reading and teaching experiences. We remembered trying to read Jealousy as if it were The Pearl. And we remembered how well our students had understood and enjoyed Slaughter House Five, until we "helped" them by adjusting the events into a logical order.

What we were beginning to sense was a conflict between the assumption that all structures are hierarchical and our experiences with texts. It seemed that the descriptive perspective allowed by the concept of hierarchy did not account for all of our experiences. We were led to wonder if most, perhaps all, research and theory from the psycholinguistic-schemata paradigm was based on a limited range of texts, a range which can be accounted for in hierarchical terms. The vast spectrum

of discourse, which is part of the everyday reading world of us and our students, is hardly addressed. This limitation may be inevitable given the ground rules under which research must operate, but it is a limitation nonetheless, and one which we thought could be serious. The spectrum of discourse may well exceed the parameters of hierarchy.

The Group's Response to the Conflict

At this point, we had two choices. In order to explain our intuitions and observations we could work harder to fit text and meaning structures (both our own and those we inferred from our students) into a hierarchical framework, or we could consider another framework. However, to follow the first avenue would be to deny the very real intuitions we had about different kinds of texts and different kinds of thinking. We chose, therefore, the second. We considered another framework, one which we came to call the "web" structure. This framework satisfied those intuitions and, the longer we worked with it, it provided more explanatory power--not only about text and meaning structures but also about how readers relate the two.

Web Structure

The web, of course, is only a metaphor for an elusive and intangible reality. It provides an image of a core or center, circled by parts forming patterns in all directions. These parts are related, but in a seemingly unsystematic and unstable fashion because the web, as we all know, is a volatile system sensitive to even the slightest touch. The difficulty of explaining this kind of structure is inevitable, inherent

in the nature of the definition itself. But listed below are two sets of features which may help. The first set contains features commonly associated with hierarchies (using an inverted tree as a visual device). These features are listed in an order which we believe begins with the most explicit and known features to those which may be considered ambiguous or borderline. In the second column are features which we attribute to the web structure. They correspond, roughly, with the list of hierarchical features.

Features of Hierarchy	Features of Web
1) main idea or overarching unifying factor on top node.	1) center or core exists, which may be an idea, a partially articulated idea, a feeling, an emotion, a sense of unity, an image, etc.
2) lower branches contain secondary ideas, all subordinate to the main idea, but related superordinately, coordinately, and subordinately among themselves.	2) a stratification of ideas does not exist, or exists weakly; levels are replaced by interconnected circles or other shapes.

Features of Hierarchy	Features of Web
3) entire system arranged in an ascending order of importance and/or degree of abstraction.	3) significance is not defined by placement because parts are equally significant or insignificant within the whole.
4) relationships among parts (beyond the three relationships listed above) are typically defined by such terms as cause/effect, comparison/contrast, includer/included.	4) relationships are defined (as well as possible) by such terms as intuited, felt, implied, personal, etc.
5) relationships are limited and have been culturally defined and catalogued.	5) relationships are virtually limitless, enjoined by the individual in what are, in essence, unique ways.
6) the identity of lower level units is lost or altered as they are subsumed by higher level units.	6) parts don't lose their identity; relationships the reader establishes do not subtract from individual units.

Features of Hierarchy	Features of Web
7) a certain linearity or flatness is implied, i.e., on any given level, items exist at separate points on a temporal plane.	7) the possibility of simultaneity and spatiality is open to all parts of the structures; contradiction and ambiguity are equally probable.

We believe that many structures, both text and meaning structures, can be described more accurately in terms of the web. We did not "invent" this list of features any more than we invented the web structure. We abstracted them from the many texts (and our understandings of these texts) which could not be described in hierarchical terms.

Consider, for example, the comprehension of poems. In our view, many poems, perhaps most, do not lead to hierarchically structured meanings. Instead, many poems leave the reader with a feeling, or perhaps an image. There are still parts to this meaning structure, such as other images or concepts, and these parts do relate to and somehow reinforce this core: but they are not necessarily related to it in layers of importance or by such familiar patterns as causality. Instead they might suggest the core, or have something in common with it--a relationship not so easy to define, but a relationship nonetheless. This is not to suggest a simple one-to-one correspondence between genre and structure type. Within the genre of poetry, some poems, such as Robert Frost's narrative poems, do suggest more of a hierarchy than a web.

But to expect the same hierarchy in, let's say, Ezra Pound's poems is to invite confusion. The web is a more realistic depiction of Pound's kind of meanings. Likewise, modern fiction is full of such contrasts. A reader of the New Yorker will undoubtedly construct something resembling a hierarchy while comprehending a Singer story, but, upon turning the page, will have to be satisfied with a web in order to comprehend one of Donald Barthelme's short pieces.

In short, we have posited two kinds of structures, the hierarchy and the web, perhaps viewed more accurately as occupying two ends on a continuum of potential structures. There is, we believe, much to be gained by having that total continuum available when describing text and meaning structures.

Comprehending Strategies

A natural extension of this view is to ask: Are the strategies used to construct a web-structured meaning fundamentally different from those employed to construct a hierarchically-structured meaning? We think so, but first two assumptions which lie behind our response must be explained.

We assume that a text's structure does motivate and guide the construction of a meaning structure. Admittedly the extent of this textual influence is a point of contention among theorists today. For example, Pickert and Anderson (1976) argue that, while a text "to some degree" contains a structure, it is not that significant in the construction of meaning. Instead the perspective a reader assumes determines such matters as structural importance. On the other hand,

Meyer (1975) claims that texts have a structure which is relatively consistent and stable. To her, such structural elements as "heights of information" (in a hierarchy) do affect recall and, by implication, the meaning structure which the reader constructs. Our assumption is not to be construed as an avoidance of these kinds of differences, only to assert the presence of the influence. The extent, which obviously depends upon a host of variables (reader's activated schemata, his/her skills, purposes, maturity, etc.) is still an open question.

Our second assumption is that readers are capable of constructing web-structures to account for texts. Many may doubt this. A statement such as "human beings appear to be incapable of understanding any other kind of system (other than a hierarchical one)" would suggest that, regardless of structures and configurations in the text, readers act the same. They translate whatever they encounter into a hierarchical structure. We question this limitation. Today split brain research is making concrete what philosophers and poets have said for centuries. That is, humans are capable of two very different modes of thinking. One is rational, the other intuitive. One linear, the other spatial, One stratified, the other holistic. And the list goes on. It does not seem out of place to add to the list: one structures hierarchically, the other structures experience into web-like systems.

We return therefore to the question: Do readers employ different strategies to construct web-structured meanings? Yes. We think that readers, at least mature readers, respond to signals of text structure

with appropriate strategies and that, as a result, they construct meaning structures which are more or less compatible with the structure of the text they are reading. Very grossly stated: a reader encountering a hierarchically-structured text would employ a particular set of strategies to construct a hierarchically-structured meaning; a reader encountering a web-structured text would employ a different set of strategies to construct a web-structured meaning. In practice, of course, it is not so simple.

Listed below are two columns of these strategies as we have inferred them from our own intuitions and observations. Those on the left are more associated with reading a hierarchically-structured text. Those on the right a web. As with text structures, it would probably be more accurate to view these as two extremes on a continuum, thus allowing for the inevitable interaction and shifting which occur as any text is being comprehended.

WHEN CONSTRUCTING A HIERARCHY	WHEN CONSTRUCTING A WEB
-Readers proceed in a linear fashion. They expect one point to follow another, and--even if there is a surface structure interruption (such as a flashback in a story or an omitted premise in an argument)--they expect these points	-Readers proceed more spatially. Linear progress is not expected, or at least not seen as a major concern. Instead they are prepared for points to exist simultaneously (i.e., all at once such as the layers of connotations sensed for an image in a poem, or the traits of a character

to eventually build into a coherent structure.

-Readers employ strategies and thinking processes commonly taught in reading courses combining smaller units into larger ones, for example, or building generalizations upon sound inferences. They use more traditional structuring patterns (such as cause/effect) as screens for organizing the details of the growing meaning. They also combine units in similar categories, such as two examples that support a premise.

developed in a novel) and recognize that many points may be lost and later joined by a flash of intuition or insight.

-Readers employ less noted processes--for example, to relax, to let things come together rather than force them into patterns. This allows intuition and feeling to build generalizations without being analytical about the results. Details are still organized, but the structuring patterns are more personal. They often combine units in different categories, such as a metaphorical relationship between a woman and a rose.

-From one perspective, readers are more active. They actively construct hypotheses about meaning. They often recognize the emerging structure of the text relatively early in the reading act and are able to predict, in general terms, the overall meaning which will result.

-From another perspective, readers are more of a spectator. They sit back (metaphorically speaking) and let the logical patterns unfold. Confusion, when it occurs, is an unnatural state which these readers must clarify as soon as possible.

-Readers are product-oriented, searching for the end, that mental structure which will ex-

-Readers are less able to predict the meaning structure of the whole text. The emerging structure, which may be clear at times, shifts easily; and they are especially ready to go backward as well as forward in order to integrate details into this changing concept.

-Readers may seem to employ a "layback" approach, but they are actually very much the participant. The mind is constantly sorting details, holding things in abeyance, waiting for those flashes that will put it all together. Confusion, hopefully temporary, is a normal state for this reader.

-Readers are more process-oriented. The fun is in the getting there. Not just

plain the written text. The goal is to achieve meaning.

-Readers achieve a response that can be parsed and articulated. For example, it's easy to tell others what essays are about. They can even be outlined in a clear scheme which gives a fairly accurate representation of one's understanding.

structure but structuring is the game. Meaning is not just a thing but an act.

-Readers have a more difficult time describing their understanding. For one thing, it's spatial, involving simultaneous relationships. It may also be too subjective, a structure based on mood or feeling. It's also difficult because the understanding is tied closely to the process of arriving at the understanding. How something was written may be more contributory to understanding than what was written. Typically, a reader's attempt to put web-structured meanings into words falls short.

After reading this list of strategies, one may conclude that some readers have a predilection for one kind of strategy or another. That is, some readers seem to be--by nature, by conditioning, by lack of reading maturity, or whatever--either hierarchical or web readers. That's

possible, but beyond our present scope. For now our concern is more focused. As we see it, the dominant use of one set of strategies or another is not totally the reader's choice. The mature reader is one who responds to signals of text structure and uses appropriate strategies in order to construct a meaning structure which accounts for the text in a satisfying manner.

Conclusion

This paper has been offered in the spirit of inquiry. We believe that both distinctions, between two types of structure and two kinds of comprehending strategies, are significant, or potentially significant, for our classrooms. But we also believe the significance can't be realized until the distinctions themselves are better understood. We conclude, therefore, seeking responses.

References

Anderson, R.C. Schema-Directed Processes in Language Comprehension (Technical Report No. 50). Champaign, Ill.: Center for the Study of Reading, University of Illinois, March 1977.

Frederiksen, C.H. Representing logical and semantic structures of knowledge acquired from discourse. Cognitive Psychology, 1975, 7, 317-458.

Holland, N.H. The Dynamics of Literary Response. New York: W.W. Norton and Company, Inc., 1968.

Meyer, B.J.F. The Organization of Prose and Its Effects on Memory. (North-Holland Studies in Theoretical Poetics, Vol. 1). Amsterdam: North-Holland Publishing Company, 1975.

Pichert, J.W. and Anderson, R.C. Taking Different Perspectives on a Story. (Technical Report No. 14). Champaign, Ill.: Center for the Study of Reading, University of Illinois, November 1976.

Rumelhart, D.E. Notes on a schema for stories. In D.G. Bobrow (Ed.), Representation and Understandings: Studies in Cognitive Science. New York: Academic Press, 1975.

Young, R. Invention: a topographical survey. In G. Tate (Ed.), Teaching Composition: 10 Bibliographical Essays. Fort Worth: Texas Christian University Press, 1976.

SOME REFLECTIONS ON DISCOURSE COMPREHENSION

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Introduction

Our ultimate goal in reviewing these papers is to answer three questions:

1. What do these papers have to say about what we "know" about discourse processing?
2. What do they say and/or imply about teaching students, particularly adolescents, to process written discourse?
3. What implications do we see within these papers for research relative to the discourse processing of adolescents?

Before we do, however, we will critique these papers within a more traditional framework: that is, we will explicate and evaluate the quality of the arguments presented.

The Estes and Steinley papers offer similar sorts of arguments motivated by different lines of reasoning. Both Estes and Steinley want to convince us that we should reject simplistic models of reading or discourse processing in favor of richer and more complex models.

Estes asks us to reject "a skills-determined linear process model of reading" (though it's really more a model of instruction) because it "is incongruent with our basic notions of what it means to be a human being (p. 3)."

The incongruent character of such a model seems, in Estes' view, to stem from the fact that such models have been developed by analogy from computers, and computers bear only a faint relationship to human understanding.

Estes then goes on to attempt to convince us that a cyclical and synergistic view of reading (derived from Neisser, 1976) is a more appropriate model of what people actually do when they read. Apparently, at least for Estes, one of the major differences between a linear and a synergistic view involves the role of the reader in text understanding. In his explication of the linear model, the reader is depicted as a pawn in the hands of clever engineers who program him to understand the exact message within a text. In essence, the meaning is in the text, and the reader must be trained to extract it accurately. By contrast, the synergistic view presented by Estes suggests that while there may be information in a text, meaning is the cross product of the text (and its accompanying contexts); the reader's cognitive, affective, and volitional being; and the particular strategies that the reader employs during reading. Obviously, the reader assumes a more active role in Estes' synergistic model.

Estes never presents any evidence to support the validity of his synergistic model over the linear model. He does not even resort to the "evidence by example" strategy typical of writers who rely on case study or anecdotal reports. He supports his argument by appealing to our basic humanistic sensitivities. He seems to be asking us to accept his model rather than a linear model because his model attributes a more active volitionary role to the reader.

Steinley also asks us to reject simplicity in favor of complexity. First he tells us that recent views of comprehension suggest that there exists an underlying structure of text (presumably it is in the text), and an underlying structure of knowledge (that the readers carry around in their heads), including knowledge about how texts, in general, are structured. Then he tells us that

"it seems" that hierarchical organizations are always imposed (by theorists, at least) upon these two kinds of structures, be they numbering systems, networks, branching diagrams, inverted trees or lists.

Steinley encourages us to join with him in rejecting this common, if not universal, assumption of hierarchical organization for text or knowledge structures. His encouragement is based upon the an dotal data that emerged from the observations of a group of secondary school teachers who were attempting to grapple with the issue of how they and their students interacted with text. What struck them during this self-analytic procedure was that different texts seemed to require different presuppositions about how units of knowledge are related to one another; that is, not all things are related in the neat subordinate - superordinate - coordinate framework provided by a hierarchy. This awareness led them to reject the metaphor of a hierarchy in favor of the metaphor of a web. They found the web appealing for several reasons, most of which reduce to the fact that the web better matched their intuitions of how they related ideas to one another as they tried to understand text. Presumably the web, at least as they perceived it, had fewer directional constraints than a hierarchy and a greater number of types of links (beyond super-, sub-, and co-ordinate) that could be used to associate ideas.

In both cases, the authors want us to shed the confinement of simple models that limit both the data and the procedures available to explain what reading is, how it works, etc. Instead, they want us to embrace complex models: models which allow for more types of data to be processed in the model (e.g., Estes wants to put more information into each of his triangles), or models which allow for a greater number of procedures to be applied to the data (e.g., Steinley wants more kinds of links between data structures stored in the mind and in the text). To convince us, the readers, that we should be persuaded, Estes has appealed to our

humanistic sensitivity and to our intuitive sense of what must be true about the way people read. Steinley also asks us to invoke our intuitions, but offers us the anecdotal data of his group of teachers as a basis of comparison against which we can map our introspections about how we establish links between ideas when we read.

Our own intuitions about these matters are not very different from those of Estes and Steinley; however, we are disappointed with the ammunition presented to convince us that complex models are preferable to simple models. We would have preferred hard empirical evidence; short of that, incisive logic or softer evidence; instead, we are offered quasi-emotional appeals to our own intuitive sense of what is or ought to be true about the world.

Furthermore, both writers have resorted to rhetorical devices in building their cases, such as the use of "straw man" models as adversaries, models to which few, if any, people in the field really subscribe.

Estes' adversary model, depicted in figure 1 in his paper, is a curious mixture of a model of the reading process and a model of instruction. Furthermore, the linear links he proposes are odd. The model implies that first you expose children to the text. Second, they apply their reading skills to the text (he says that skills are independent of the text, but he has not depicted them as such in the model). Third, the readers comprehend and store the information. Fourth, they retrieve it in a form as close as possible to the original message in the text. Although Estes never calls it such, in our judgment he is describing a bottom-up model of reading which assumes that what goes into long term memory store is accomplished through a <u>reproductive</u> procedure. The model is bottom-up in the sense that lower order units are processed before higher order units in a uni-directional procedure. The term reproductive is applicable to the process of encoding information in memory because Estes wants to imply that what is rendered by the reader during retrieval is as close a match as the reader can make to the

original input. Only an encoding mechanism which assumes that readers attempt to store input in an uninterpreted form, i.e., a reproductive mechanism, will allow for such an hypothesis.

The problem with Estes' argument is that no such model of reading exists, as far as we know. There are bottom-up models of reading (Gough, 1972; Carver, 1977); however, these bottom-up models do not imply that information is encoded in memory in as close a match as possible to the form of the input. All allow for the possibility that the store of prior knowledge which the reader brings to the act of reading can influence both the structure and the content of the data that gets encoded into memory. To use the language of the cognitivists, even a model of reading as "bottom-up" as Gough's can have a constructive (i.e., interpreted) memory encoding procedure.

Steinley's straw man is every bit as elusive. Steinley apparently attributes a hierarchical structure to all systems which try to specify both the semantic structure of knowledge in memory and of information in text. We will grant that most semantic structure systems with which we are familiar (e.g., Meyer, 1974; Frederiksen, 1975; Collins and Quillian, 1969; Kintsch, 1974; Lindsay and Norman, 1972; Rumelhart and Ortony, 1977; Minsky, 1975; Schank, 1972) tend toward hierarchical organization; however, such systems do not necessarily demand that such structures be organized in a strictly hierarchical scheme.

Take the notion of a semantic network, for example, of the type proposed by Collins and Quillian (1969) or Lindsay and Norman (1972). Clearly, the links which subsume examples under class labels are hierarchical. But what are we to do with attributes (e.g., the fact that canaries are yellow or that dogs bark)? They are hierarchical in only the weak sense that attributes are attached to concepts. But clearly, yellowness is not subsumed under canaries nor is bark subsumed under dogs. And how are such networks to account for the weird kind of

associations that people come up with, such as nail and ladder? A strictly hierarchical system has difficulty explaining the ease and commonness of such an association. In fact, some (e.g., Collins and Loftus, 1975) have suggested a spreading activation metaphor to account for such phenomena; that is, it is nearness, not hierarchicalness within the network, that counts. Finally, when networks are expanded to account for relationships among propositions or sentences rather than simply concepts abstracted from their episodic state (e.g., Lindsay and Norman, 1972), the number of links necessary to create a system expands rapidly. In addition to class, example, and attribute, links must be added for cause (A causes B), time (A happened before B), manner (B occurred in manner A), agent (B made A happen), recipient (A happened to B), and so on. Surely such links are relational and structured, but they are hardly hierarchical in any commonly accepted meaning of the term.

We think it is unfair to suggest that such systems hold hard and fast with hierarchies. What is more equitable is to say that such systems prefer hierarchies but allow for weaker relational or associative links among concepts or propositions. Hierarchical links are to be preferred because they are more powerful. If we know that A is an example of B, we know that everything that is true about B is true about A. However, if all we know is that A is often followed by B, all we can assume, when we know that B occurred, is that A may have (or probably had) occurred. Inference within a hierarchy is more precise (less pragmatic) within a system of co-variation or co-occurrence. The logic implicit in the systems presently available seems to be: If you can find a hierarchical relation, accept it graciously; but don't expect everything to be so neatly organized.

These complaints notwithstanding, we now admit that we find ourselves philosophically allied to the points of view expressed by Estes and Steinley. We, too, demand greater complexity of models of comprehension (models to match our minds,

if you will) than we see in certain of the existing models. We, too, have been frustrated by the failure of existing schemes to capture our intuitions about how we understood a passage or related two ideas. We, too, aspire to humanistic ideals, ideals that posit more than a computer-like precision to our cognitions. We understand their motives for choosing the direction they took.

The Questions

1. What do Estes and Steinley have to say about what we know about discourse processing?

In a sense, we have already answered this question. What Estes and Steinley are telling us, each in his own way, is that things are not as simple as some theorists would have us believe. Estes suggests that the process is transactional, the triple product of a reader's beliefs, attitudes, knowledge, a reader's processing strategies and a text (which would include, presumably, the beliefs, attitudes and knowledge of a writer). Steinley has offered us a new metaphor for organizing our knowledge; he prefers the web to the inverted tree, arguing that the weaker and more numerous links permit an organization more consistent with our intuitions. A strong and consistent conclusion that may be derived from either author is the powerful influence that prior knowledge plays in understanding and interpreting a new text. Estes, in fact, goes further, suggesting that the most direct way to influence a reader's comprehension is to influence his knowledge, attitudes, or values.

2. What do Estes and Steinley say and/or imply about teaching students, particularly adolescents, to process written discourse?

The issue of teaching implications based on the more complex models is handled differently by each writer.

Steinley's suggestions must be inferred, while Estes is explicit in proposing two general and ten specific classroom implications. We will discuss the implications of Estes' paper, followed by our own inferences about Steinley's position.

There is a problem, however, with all the implications listed in that, valid though they may be, they do not follow uniquely from the synergistic model (or from the web). That is, we seem to be adding little to our knowledge about intuitions of good teaching strategies as a result of either of these models. Unless one is willing to assume that interaction between reader and text is unique to these models, one can't consider the implications as adding new insight to the field.

Most of Estes' implications for teaching fall into four basic categories: (1) meaningfulness of the text, (2) background knowledge of the reader, (3) reading strategies, and (4) time allocations for reading.

He states that text must be meaningful to the reader, and must be of appropriate difficulty and interest. Closely related to the necessity of providing appropriate text material is the notion of providing the appropriate environment to maximize learning. This can be done, in Estes' view, within the confines of content area instruction without sacrificing learning, as well as in the developmental reading program.

The issue of background knowledge involves not only teaching to improve the child's background knowledge, but also instruction to improve his awareness of the role that his own knowledge can play. While Estes' model emphasizes the importance of background knowledge, it is vague in its implications as to how to alter a reader's existing knowledge structure.

Perhaps one of the most important implications of Estes' paper is the suggestion that students should be taught reading strategies appropriate to different types of text. Estes suggests the need for instruction in varying reading speeds,

study skills such as note-taking and summarization. This suggestion derives directly from his view of the text processing: in fact, reader strategies is one of his three basic components.

The fourth kind of recommendation, time allocations, includes both time for reading and time to allow comprehension to occur. With this latter suggestion, Estes indicates comprehension may occur (or at least change) after reading is completed. In making this point, Estes accepts a reconstructive view of memory, one that allows for interpretation of stored content after encoding.

One of Estes' general implications concerns us. Estes takes the position, supporting it with Frank Smith's observations, that reading is never learned in isolation from its use and that children can learn to read only by reading. We agree with part of the statement. Reading cannot be decontextualized. The specific implication derived directly related to this statement is questionable. Estes states that "it is never true that at some life stage the person is learning to read," indicating that "the child of eighteen months, the kindergartener, the third grader . . . all become more capable readers as a result of the effect which reading has had on them" (p. 13). We question the implications of this position. He appears to be implying that there exists no separate phase for the acquisition of reading skills, that it is merely a continuum from early reader to better and more efficient reader. While it may be reasonable to assume that the adolescent with poor reading skills possesses skills similar to the better reader, it seems unlikely that we can assume this to be the case in the child of eighteen months or the kindergartener.

Steinley has no explicit section on teaching implications, though we feel he would probably endorse some of those proposed by Estes. The idea of the web emphasizes the variation between texts. This implies the need for different reading strategies as a function of type of text, and it follows that these strategies would need to be taught as a type of reading skill.

Since ambiguity and contradiction are characteristic of text, it would appear necessary to teach the reader to "lay back," to withhold judgment of the author's intent until details of the text can be sorted and generalizations drawn. Steinley seems to imply the need to prepare the reader for "constructive confusion."

3. What implications do we see within these papers for research relative to the discourse processing of adolescents?

An important issue raised by both Steinley and Estes is the question of the degree of complexity of the reading process. That it is complex we do not deny, but the role of the researcher should be to explicate the complexities. We view the following types of research as consistent with issues raised by Steinley and Estes.

The top-down/bottom-up distinction has been a continuing debate, but these papers indicate a need to further examine the difference between the two processes, perhaps with an emphasis upon what types of text require more of which type of processing. Appropriate to this might be investigation into the nature of the interaction between "cognition, volition, and affect" when reading.

We need much more work on the prior knowledge question. Most theorists - including Steinley and Estes - think it is important. Much research supports its importance in determining comprehension and recall of text. What we do not know, however, is very much about the effects of specific attempts to provide background knowledge when students do not possess it to begin with. That is, do students who are "taught" specific knowledge structures comprehend more like students who have assimilated those structures over a long period of time than they do like students who never had the structures at all? Put differently, we must begin to examine the effects of learning on comprehension.

Both Estes and Steinley raise the possibility that reader strategies may interact with types of texts. A focus on strategies is a specific component in

Estes' model, and it is inferrable from Steinley's comments about differences among text reading experiences. Both seem to be saying that readers need to be flexible. Surely we need research that tries to pinpoint what we mean by flexibility. Is it really true that poetry requires more of a bottom-up approach in which we defer to the author's schema, holding our own schemata in abeyance? Alternatively, should exposition be read more in a top-down fashion, generating hypotheses about meaning and scanning the text for data to confirm, disconfirm, or revise those hypotheses? Can readers be taught to monitor their comprehension so that they can switch from one kind of processing to another at precisely those points where knowledge/text relationships require a shift?

A final, and related area to investigate may be the distinction between difficult and different raised by Steinley. That is, is a text difficult BECAUSE it is different, or is there something inherent in text that makes some harder to process than others? We need to investigate what facets of text make it difficult to organize such that its uniqueness renders it difficult to comprehend.

In conclusion, we applaud Estes and Steinley for addressing the difficult issue of conceptualizing text comprehension. We hope our criticisms will be taken in the spirit in which they were offered: as a means of delineating or "fine-tuning" those ideas suggested by both Estes and Steinley, as well as an attempt to mesh their two viewpoints. In an area as complex as reading comprehension, continuous formulation, evaluation, and reformulation is a necessary part of progress.

References

Carver, R. P. Toward a theory of reading comprehension and reading. Reading Research Quarterly, 1977, 13, 8-63.

Collins, A. M. and Loftus, E. F. A spreading activation theory of semantic processing. Psychological Review, 1975, 82, 407-28.

Collins, A. M. and Quillian, M. R. Retrieval time from semantic memory. Journal of Verbal Learning and Verbal Behavior, 1969, 8, 240-47.

Frederiksen, C. H. Representing logical and semantic structures of knowledge acquired from discourse. Cognitive Psychology, 1975, 7, 317-458.

Gough, P. B. One second of reading. In H. Singer and R. B. Ruddell (Eds.), Theoretical models and processes of reading. Newark, Del.: International Reading Association, 1976.

Kintsch, W. The representation of meaning in memory. Hillsdale, NJ: Erlbaum, 1974.

Lindsay, P. H. and Norman, D. A. Human information processing: An introduction to psychology. New York: Academic Press, 1972.

Meyer, B. J. F. The organization of prose and its effects on recall (Research Rep. No. 1). Ithaca, NY: Cornell University, Department of Education, Reading and Learning Series, 1974.

Minsky, M. A framework for representing knowledge. In P. H. Winston (Ed.), The psychology of computer vision. New York: McGraw-Hill, 1975.

Neisser, U. Cognition and reality. San Francisco: Freeman, 1976.

Rumelhart, D. E. and Ortony, A. The representation of knowledge in memory. In R. C. Anderson, R. J. Spiro, and W. E. Montague (Eds.), Schooling and the acquisition of knowledge. Hillsdale, NJ: Erlbaum, 1977.

Schank, R. C. Conceptual dependency: A theory of natural language understanding. Cognitive Psychology, 1972, 3, 552-631.

Author and Reader:

The Communication Connection

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The tenor of current thought on reading comprehension, what it is and how it can best be fostered, is moving in a direction somewhat influenced by the work of cognitive psychologists. In theories proposed by a combination of educators, psychologists, and applied psycholinguists, increased emphasis is being placed on the notion that meaning is not an immutable property inherent in text but is the result of an interaction between text and reader. In many recent experiments in educational psychology, materials and situations have been arranged to demonstrate how different the interpretations of a text can be when read by people with different knowledge or for different purposes. In recommendations to teachers, an increased emphasis focuses on the need (1) to take into account each individual reader, (2) to allow students to construct personal representations, and (3) to foster fluidity and variance in the development of meaning.

In their underlying messages, both Estes and Steinley confirm and underscore this general orientation. The specifics of how they couch their message are amply discussed by Pearson and Raphael. From our perspective as educational psychologists interested in the reading process, one implicit issue stands out in these two papers. Estes and Steinley raise, for us, the crucial question of the role of text in the reader-text interaction. It is to this issue that we will address our reaction.

We take as a point of departure the view of text that Estes and Steinley present. Let us protray it in terms of an analogy: A balance representing reading comprehension holds in one of its pans the text and, in the other, the reader. In the not very distant past, the text was considered to play the greater role in determining meaning. Many believed, as some still do, that meaning was in the text and that the text was somehow the final authority in any judgment of accuracy of interpretation. The balance was, at that time, tipped heavily on the side of the text. Recently, we have experienced a shift in the view of reading comprehension. The reader is now seen as making an essential contribution to "meaning-getting." Some even go so far as to base the meaning event solely within the reader and to relegate text to a very minor role in the construction of meaning. The balance has now shifted and registers heavily on the side of the reader. Estes, in particular, represents this extreme position, pitting the humanity of the reader against the inanimate nature of the text.

We would like to present a somewhat different model of meaning construction. Obviously, when a balance analogy is presented, equilibrium between opposing views will somehow figure in the resolution. We believe this equilibrium becomes a possibility when we replace the text that fills one side of the balance with the author of the text. Now, reading becomes but one aspect of a communication act which takes place between one thinking being and another—an author and a reader. The author brings to this interaction cognition, affect, and volition just as the reader does. The text represents the author's effort to communicate a message of value and to affect a reader in some important way. Where Estes argues that "surely the reader is infinitely more important than anything he or she might read" (p. 15), we propose that in the communication act involved in reading written text, the author and the reader are of equal importance.

In viewing the reading process as a communication act, we see both writer and reader "working" at constructing meaning. The writer works at making judgments as to what words, what organizational patterns, what strategies to convey meaning are appropriate. The reader works at using the clues provided by the author to construct something like what the author intended to say. The author and reader meet half-way, and when it works, the balance stands in perfect equilibrium. More likely, however, what the author meant to say was not perfectly represented in what actually was said, due partly to the limitations of written language and partly to the imperfect nature of anyone's ability to represent one's own cognitions. Likewise, what meaning the reader constructs, reflects the interaction of his or her own cognitions, affect and volitions, and as such represents what he or she thinks the author said. Of course there will be mismatches; of course there will be times when an author has not chosen words, images, or structures of ideas wisely for a particular reader, and times when the reader ignores or misperceives important clues given by the author. To the extent to which the balance can be equalized, however, communication of a sort will occur. Where we once worried about measuring the accuracy of a reader's comprehension, we now face the task of evaluating the effectiveness of communication. Responsibility for comprehension no longer rests with just the reader, but becomes the author's as well.

There is a purposeful similarity between the view presented above and Grice's (1975) analysis of language production and comprehension in terms of the Cooperative Principle. As is summarized in the following table, participants in a conversation adhere to an implicit contract to communicate, to understand and to be understood. Grice primarily considers a face-to-face oral exchange, but his analysis can obviously be extended to account for the interaction between author and reader. In fact, a number of researchers in the field have pointed

this out, most notably Gary Olson (1978). The following table represents our attempts to modify and adapt both Grice's formulation of the rules governing the speaker-hearer interchange and Olson's extension of the rules to explicate the author-reader interaction.

RULES WHICH GUIDE THE SPEAKER-HEARER INTERACTION

Cooperative Principle: At the stage at which it occurs, a speaker's contribution should be sensitive to what is required by the direction of the current talk-exchange.

Speaker's Specific Rules:

1. Quantity: A speaker should be as informative as is required for the current purposes of the exchange and not more informative than is required.

2. Quality: A speaker should say only that which he or she believes to be true and for which there is adequate evidence.

3. Relation: A speaker should make his or her contribution relevant.

4. Manner: A speaker should be perspicuous and avoid obscure expressions, ambiguity, unnecessary prolixity, etc.

Hearer's Specific Rules:

1. A hearer should assume that any apparent violation of a specific rule by the speaker is purposeful and is ultimately in accordance with the Cooperative Principle.

2. A hearer should make the necessary inferences required to reconcile apparent violations.

RULES WHICH GUIDE THE WRITER-READER INTERACTION

Guidance Principle: A writer should guide the reader through the task of reconstructing the intended meaning.

Writer's Specific Rules:

1. Purpose: The writer should have a purpose in writing a text, such as to interest, amuse, or instruct a reader.

2. Message Organization: A writer should construct a coherent plan for the ideas to be presented.

3. Text Organization: A writer should adhere to a plan for the presentation of ideas which reflects orderliness, connectivity, and good structure.

4. Economy: A writer should present only as much as is essential, mentioning significant details to serve a purposeful function and reflecting importance in length of exposition.

5. Discrepancy: A writer should mention only those departures from the typical that are important to the message.

Reader's Specific Rules:

1. A reader should assume that the writer is observing the implicit contract of the Guidance Principle.

2. A reader should work at using the clues provided by a writer to reconstruct the message.

Placing our focus on the communicative nature of the reader-writer interaction as opposed to the receptive nature of the reader-text interaction leads to an instructional program which encourages students to experience "meaning-getting" from both sides of the issue. As readers, they use clues provided by the writer to attempt to construct something like what the author meant to say. As writers, having experienced what clues readers need, students often struggle to represent their own ideas so that the other person involved can construct a similar meaning. Even with very young learners, the Cooperative and Guidance principles influence strongly the communication act.

Brooks Smith (Smith, Goodman and Meredith, 1976) identifies a process of "coming to know" through symbolic transformation and the representation of experience which seems relevant to our reader-writer interaction model. Although separated in time, both writer and reader go through three phases of making sense of new information: perceiving, ideating, and presenting. The writer perceives an event or idea which, because of prior experiences, takes on some importance. Once perceived, the details and ramifications of the idea begin to expand as it is processed and stored. This ideating phase involves language, affect, and cognition and allows the writer to come to terms with the new idea by constructing a private meaning for it. During the next phase, presenting, the writer makes the new idea public by representing it in a form which can be shared with someone else. The shared experience is perceived by a reader who expands it through the ideation phase and presents it, now somewhat changed, to someone else. The presentation of ideas reveal new, related ideas which can now be incorporated into the old ones and the cyclic nature of the "coming to know" process begins anew. Instead of being on the outside of the process of receiving information, the reader becomes an active participant in the meaning-getting process.

In the communication process involved in reading written text, both the reader and the writer are engaged in translating and transforming ideas. If we look at this process with a text-reader focus, the symbolic representation is fixed, static, unchanging. But if we focus on the writer-reader interaction, we can allow for exchange of ideas in all three phases. The writer, while presenting, is also ideating. This written text is not his or her final word on the idea: it represents merely where thinking has progressed so far. If we encourage readers to see the text as not the end result but as a peek at the process of "coming to know," they may begin to see the fluidity and variance that is always part of knowing.

One effective means of helping students understand this cooperative nature of communication is to provide opportunities for readers to be writers. With the focus on communicating an idea rather than simply receiving one, learners begin to develop an empathetic appreciation and understanding of the communication process. Through discussion, reaction, and revision, they begin to see how good writing gets the job done and why poor writing fails. They learn that the text is not inviolate, that meaning is relative, and that reading and writing are interdependent. They learn to evaluate their own writing as well as that of other writers and, further, they learn to determine the appropriateness of words, images and structures. Reading strategies which are never viewed outside the realm of the communicative process are relevant and purposeful.

Essentially, reading is a construction of meaning by the reader, but that construction does not happen outside or apart from the representation of a writer's idea. When the reader-writer interaction is viewed within the realm of communication, several traditional "reading" problems are eliminated: (1) both purpose and function have been established so that any reading act is less likely to be a "dry run"; (2) no snobbish hierarchy of "good" literature

can result since whatever communicates with the reader is what is appropriate: and (3) the reading skills or strategies taught cannot exist in isolation but emerge as necessary devices for "meaning-getting" whether from the point of view of the reader or of the writer. The reader as writer and the writer as reader: this is the interaction which we propose will make comprehension work and allow the balance to reach some semblance of equilibrium.

Postscript

In the field of reading, there have been advocates for every aspect of the reading comprehension process. Over the course of the development of the field, educational psychologists interested in reading have first viewed the text as a receptacle for meaning, then focused on the reader as the prime source of "meaning-getting," and finally, considered the contributions of both the author and the reader in the act of communication. What will be the next wrinkle in the progression of our ideas about comprehension and communication? A difficult and dangerous question to tackle, but just as difficult to resist. Wouldn't it be ironic if our views once again were to focus on the text? The current interest in writing makes this a likely possibility. Hopefully, our next go-round with text will reflect a richer understanding of the other elements involved in comprehension, the reader and the author.

For now, in the name of intellectual games, consider what authors often report experiencing. As an author writes, the text seems to take on a life and will of its own. Although the author had an unformulated but distinct idea of what the message should say, the saying of it comes to direct the flow of ideas. Although the author at one time may have seen that some point clearly followed from a progression of ideas, that idea can no longer be stated because of the words that already exist on the page and that must be meshed in some way with

the next piece of text. Similarly, authors of all degrees of proficiency experience a greater or lesser reluctance to discard the product of painful struggles to express ideas in words. In addition, who has not heard a literature teacher say to frustrated students that it does not matter what the author meant to say when the text was written since it now exists in a new context and can now mean something entirely different? Such comments only seem to exasperate the students further, but there is truth in the statement.

Perhaps in a few years we will again hear the voice of advocates of text, defending the rights of text to mean and say what it will, but they will, perhaps, be tempered by the enlightenment of the importance of what the reader brings to the interaction.

References

Grice, H. P. Logic and conversation. In P. Cole and J. L. Morgan (Eds.), Syntax and semantics (Vol. 3): Speech Acts. New York: Academic Press, 1975.

Olson, G. Colloquium presentation given at the Center for the Study of Reading, Champaign, Illinois, Spring, 1978.

Smith, E. B., Goodman, K. S., and Meredith, R. Language and thinking in school. New York: Holt, Rinehart and Winston, 1976.

PRIOR KNOWLEDGE AND LITERARY INFERENCE: A RESPONSE TO ESTES AND STEINLEY

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In constructing models of what readers do when they read, some reading theorists begin inductively with data about reading behaviors and thereby derive their models, while others begin with theory which is then subjected to empirical testing. Steinley proposes a model designed to explain the differences in readers' inference strategies across different discourse types, a model inductively derived from some readers' intuitive responses to fiction. On the other hand, Estes' model, derived from cognitive processing and schema theory, is more deductive in nature. Although it is highly theoretical, it does lay the groundwork for possible empirical verification.

Both of these models describe how readers use their prior knowledge in making inferences about texts. The value of these models, however theoretical or intuitive, is that they suggest new directions in the now ongoing research on the relationships between prior knowledge and inference. I will be focusing my response on the nature of this complex relationship, adding some of my own amendments and elaborations.

One of Steinley's contentions is that different texts require quite different inference strategies—readers learn to approach a haiku with a different set of inference strategies than a short story or, for that matter, an editorial or a book review. Readers develop text schema that allow them to identify a certain genre type. Meyer's work (1975) indicates that in recall, subjects' comprehension varies according to the presence or absence of predicates that

function to announce a text's structure—for example, a problem/solution structure. This suggests that readers learn to scan a text in order to identify cues implying structural types. Because readers bring prior knowledge of prototypical cue/structure relationships, they can then identify the structure.

One problem with Steinley's distinction between a "hierarchical structure" and a "web structure" (a problem which he acknowledges) is that these structures could describe either texts or the schema readers bring to texts. Take, for example, a story that is a rambling collage of unrelated thoughts. It could be argued that in order to understand the meaning of that story, a reader should employ strategies consistent with the "web" approach because inferring the relationships among the thoughts requires linking of parts into a larger whole, associations that may be totally non-hierarchical. However, a reader may still attempt to use a structured narrative schema to understand that story. Such a schema would not be totally inappropriate if, for example, the writer is satirizing a narrative structure. Steinley assumes that it is possible to determine that certain strategies ("web" versus "hierarchical") are more or less appropriate for understanding certain texts depending primarily on structural features of a text. While I would agree with that, I would add that in order to determine the appropriateness of certain schema, a reader may also need to be able to determine the writer's intentions. If a writer intended a story as a spoof on a highly structured analytic piece, then certain hierarchical schema would not be inappropriate. This suggests that it is difficult to build a model positing that certain reader schema are more or less appropriate for certain types of text without some determination of a writer's intention, something above and beyond simply determining a text's structure.

Adolescents may have more extensive knowledge of Steinley's "hierarchical structures" than "web structures," or of narrative structures. Thus, when

Steinley refers to differences in the strategies readers bring to texts, these differences need to be examined from the perspective of adolescents' discourse development.

It may then be possible to explain early adolescents' difficulty with experimental fiction: the story does not readily conform to, or openly violate, the narrative schema they are using to make sense of it. Or it may be possible to understand why young adolescents have less difficulty in making inferences about characters' natures than about writers' intentions—because they are more familiar with the social conventions constituting characters' behavior than they are with conventions governing literary form.

By embedding these models into a larger model of discourse development, it would be possible to define the inference process according to adolescents' knowledge of discourse conventions. As they develop in their tacit knowledge of conventions constituting discourse genres or conversation, or rhetorical strategies, they use this knowledge in making inferences about texts (Shuy, 1978.)

As an example of this development, let me focus on adolescents' development of knowledge of conventions constituting narrative. Inferring an author's intention involves a reader in trying to determine the underlying purpose or motive for telling a story or an incident within a text. An author is not going to make that purpose explicit, but rather will imply purpose through the manner and technique of telling the story. Purpose encompasses more than simply the intended point or moral; it includes the intended effects on a reader—how the author hopes the reader will respond to the work. The purpose of my telling someone about a fatal accident may be to communicate the tragic nature of the accident. I will, therefore, be doing more than simply relating the events of the accident: I will be communicating through my particular rendering of the events what I believed to be the tragic nature of the events, hoping that my audience will respond accordingly.

In understanding the processes by which readers use their prior knowledge to make inferences about purpose, there are two key concepts originally defined by Labov and Waletzky (1967): "tellability" and "evaluation." (See also Pratt, 1977, for her discussion of Labov's analysis of oral narrative.)

Inferring the tellability of a story requires understanding of discourse conventions. Labov notes that while a story teller can simply refer to events, the teller also may evaluate the events in order to convey the meaning or point of the experience to the audience—why it is that the experience was worth telling. Labov's analysis of oral narrative indicates that the reason for telling stories—what makes them worth telling—has to do with what he defines as the stories' tellability, the fact that the story's events are unusual, out of the ordinary or a deviation from the norm. It is this violation of norms that serves as the underlying impetus for bothering to tell someone a story: the teller assumes that the audience will share the teller's assumptions that the events constitute an unusual event or a violation of norms.

In order to dramatize the tellability, a teller employs what Labov defines as "evaluation," stylistic devices that accentuate the violation of norms, prefaces such as, "you wouldn't believe what happened as I was walking down the street," or, in oral versions, accentuation of certain words. These cues focus attention on which aspects of an event constitute a violation of the norm.

All of this has implications for analysis of how readers use their prior knowledge in making inferences about narrative, particularly in making inferences about the point of the story. Readers bring knowledge of the conventions or norms that constitute the events described in the story. If they are not familiar with certain conventions, then presumably they would have more difficulty in inferring the tellability of the story. For example, if they are unfamiliar with the social norms constituting power and status in a university

and were told that an instructor insulted a full professor, they may be less able to infer the point of that event than someone who was familiar with a university's social norms. It is also possible that a reader may be familiar with the norms but not believe them. A reader who is skeptical about UFO's may infer the point of an account of a UFO sighting, but not believe that anything unusual occurred.

Readers will also differ in their knowledge of how cues convey tellability. While some of the cues are less apparent in written than in oral discourse, a reader who has learned to recognize certain stylistic devices may be able to infer author's intention.

I use this example of narrative to suggest that if prior knowledge of discourse conventions is important, then as students develop increased knowledge of conventions, they may also improve in their inference ability.

Adolescents continue a process begun at an early age of developing knowledge of increasingly more complicated and coherent narratives (Applebee, 1978). They become increasingly adept at structuring a story according to its tellability. Thus, in conversation, they may be able to use stories as illustrative anecdotes. They also develop increasing knowledge of narrative structure, which provides them with a familiar schema for speaking or writing. However, given their everyday discourse experiences, adolescents may be less familiar with other discourse structures, and may, therefore, have more difficulty in comprehension of less familiar discourse structures. Shaughnessy (1977), in her analysis of remedial college students' writing, found that many students were unfamiliar with what she defined as "academic conventions" constituting logical arguments.

The degree to which familiarity with prior knowledge of different types of text schema influence inferences remains an intriguing prospect for further research.

I was somewhat disappointed with the rather obvious implications Estes drew from his model: that people learn to read primarily by reading, that reading should be a purposeful activity, that texts should be selected according to students' interests or that students should learn how to reflect on their reading. While I can't disagree with any of this, I believe that we need more specific implications as to methods for diagnosing students' cognitive or discourse skills and then engaging them in the appropriate inference activities.

However, Estes points to an important, intriguing phenomenon in discourse processing—the alteration of schema or perspectives as a reader moves through a text or from text to text.

Estes' model portrays a reader's continual modification of schema, knowledge, beliefs, attitudes, feelings. Little of the research on the effects of prior knowledge on recall or inference has examined this continual, on-going schema modification during and after reading a text. Research could examine not only how certain schema direct attention to the text, but how the text then alters the reader's schema.

If it is the case that schema direct attention to only certain aspects of a text, then readers may only find what they're looking for, inferring meanings relative only to their particular perspective. It may be the case that certain texts may force readers to alter their schema more so than other texts (like descriptions of a home as used in the home-buyer/burglar perspective study by Pickert and Anderson, 1976). Certain readers, given cognitive or personality differences, may cling more steadfastly to their schema and be less open to the text's challenges. On the other hand, a reader may have such an ill-defined set of schema that they are simply overwhelmed by a text because they have nothing to direct their attention or define a purpose for reading.

Expanding on Estes' model, let me briefly outline some of the specific phenomena that could be studied in research on a reader's on-going alteration of schema, particularly in terms of a reader's inferences about characters' acts in a literary text.

Readers bring a whole range of schema to a text, including prototypical knowledge of various subjects as well as knowledge of discourse types or text schema as discussed by Steinley. As they enter the text, readers begin to use certain initial cues to determine what aspects of this knowledge would be more appropriate for a given text. It would be interesting to examine how decisions about the appropriateness of certain schema are made at this initial stage. Some of these decisions are based on conditional reasoning that derives from a reader's tacit knowledge of assumptions about cue/discourse type relationships. The reasoning might proceed as follows: "Because the writer begins with 'once upon a time,' this text is a story, because (statement of assumption or schema) writers typically begin stories with 'once upon a time.'" Or, a reader could initially identify a discourse type as a problem/solution structure because they recognize cues implying an initial problem. With less well-defined texts, readers may have more difficulty tracking down the cues because their prior knowledge of cue/discourse type relationships is less well defined. Researchers, using probe questions, could elicit a reader's reasoning process and then explore individual reader's assumptions about cue/text types of relationships.

Similarly, with subject matter schema, a reader brings certain assumptions about topics that influence their initial response to a text. A reader who believes that most politicians are corrupt is going to respond to an article about political behavior in a manner quite different than someone who believes that most politicians are not corrupt.

In addition, readers bring certain expectations about how an article will serve their purpose for reading; they expect that a recipe will tell them how to bake something, or an editorial to convince them of the validity of an editor's opinion. They then examine their own response in order to determine whether these expectations are being fulfilled. If they sense that the recipe is not giving them the information they need, they then either check back through the text or alter their expectations.

Consistent with Steinley's belief that readers bring different discourse type schema to different texts, readers, in responding to literary texts, may jettison any expectations for pragmatic effects and respond primarily to the intrinsic aesthetic use of language. Using a "web" structure or schema, a reader may then derive meaning in terms of emotional or autobiographical associations evoked by the poem.

As readers then proceed through a text, it would be interesting to trace their continual testing out and alteration of schema. With certain texts, a reader may have a clear sense of direction, as in a well-defined chronological description, and will, therefore, know which schema are most appropriate to apply at different stages of a text. With other texts, a reader may have more difficulty testing out schema because they cannot define the overall structure into which they can embed various parts or sections.

It would also be interesting to determine a reader's ability to test out the appropriateness of certain schema. One criterion for testing is the consistency with which the schema applies to a text. If, for example, a reader infers that a story is describing the usual hassle of returning an item to a department store, and if the reader's schema for "hassles" is consistently reaffirmed, then the reader knows that that schema is appropriate for that text.

As readers move through a narrative, they develop an increasing sense of the writer's purpose in using certain parts within the overall story: readers use their sense of the whole as a perspective to understand the functions of parts. To take one example, in a Damon Runyan story, a group of men decide to rob a safe. They convince a friend, a safe-cracker, to help them by agreeing to babysit the man's baby: they bring the baby along to the robbery. A reader, at that point, may use knowledge of story structure, in which goals are often thwarted, creating conflict, coupled with their knowledge of babies, to predict that the baby may cry and alert others about the robbery. A reader then knows which information to use for testing the validity of that prediction. When the baby begins to cry, the reader focuses on that behavior. However, if the baby doesn't cry, then the reader would need to drop or modify that prediction.

A reader uses prior knowledge of both social and literary conventions to make inferences about characters' acts. As illustrated by Figure I, readers bring knowledge of conventions constituting social behavior. This knowledge consists of assumed prototypical relationships among acts, goals, traits, beliefs, states, contexts. For example, a reader knows that in everyday social exchange, if A requests that B do something, then A must have the power or status to make that request, an assumed relationship between acts and traits. Thus, if a reader infers that a character's utterance constitutes a request, then the reader may also infer that that character has a certain degree of power over B.

Readers learn these speech act rules (as formulated by Austin, 1962: Searle, 1969: Labov and Fanshield, 1977) from everyday social experience. These rules define the conditions that must hold in order that an utterance be considered as a certain type of speech act—inviting, asserting, promising, requesting, etc. For example, in order that an utterance such as "the door is open" count as a request to close the door as opposed to a description of the door, a speaker

should believe that his audience is able to perform the act, should intend his utterance to be taken as a request, should be sincere in making the request and should have the power or status to make a request. A reader must infer these conditions from what they know about characters' beliefs or mutual knowledge.

In order to make inferences about characters' beliefs or knowledge, readers rely on their prototypical knowledge of character types or story structures, schema that define typical relationships among acts, beliefs, goals, traits, states, and contexts. A reader who knows that in a mystery story the detective typically persists in gathering the most incidental clues in order to catch the criminal also knows that the detective is steadfast and persistent, two traits consistent with the detective's acts and goals. If information about any one component is not explicitly stated in the text, a reader, using knowledge of these interrelationships among goals, beliefs, acts, traits, states, or contexts, infers the missing information.

However, aside from highly formulaic, stereotyped texts, most texts violate a reader's prototypical knowledge of these components so that in order to derive the most appropriate explanation for a certain act, a reader is constantly trying on new schema in order to discover a pattern of reasoning or logical relationships that seem to fit the text. If, for example, a reader explains a character's act in terms of a certain goal and set of beliefs, the reader then tests out those goal and belief inferences to determine how well they work in explaining subsequent acts.

Research could also determine those strategies that are unique to explaining events in literary texts as opposed to explanations of actual, everyday events. Students certainly employ the same strategies for explaining everyday events as in explaining characters' acts. However, there are some important differences. Characters differ from persons in that a reader creates certain conceptual

entities that are then identified or perceived as characters. These conceptual constructs need not include any personality traits; a character could be perceived as a backdrop figure simply functioning to establish a setting's atmosphere. A reader would conceive of that character's acts primarily in terms of the writer's own intentions: to establish a setting. Explaining a character's acts, therefore, requires a reader to also explain the author's intentions in using those acts for some symbolic purpose. For example, character A invites B out for a date. A reader could, using their knowledge of social conventions, infer that A wants to marry B. A reader could also infer that the writer is using A's inviting act to show that A is self-confident.

Readers may vary in the type of reason they use in explaining an act, opting for a trait explanation rather than a goal explanation: "He killed her because he is crazy," as opposed to "He killed her because he wanted her money." It's an open question as to whether any one type of component inference is necessarily preferable or more valid than any other type of inference. In their work with elementary age students, Stein and Glenn (1977) found that goal inferences are helpful for inferring or stringing together characters' acts. However, for older readers with more complex texts such as those of concern to Steinley, inferring an appropriate trait inference may be equally important to understanding the text.

The types of inferences students employ is also a function of the inference tasks. In our own research using recall of a short story (Zimba, unpublished) and a one-act play (Beach, 1979), the recall data was categorized according to types of inferences. In response to the one-act play, high school and college students responded typically in terms of restating the dialogue; the next highest mean percentage consisted of inferences about the types of speech acts, followed by inferences about the effects of acts on other characters. There

were relatively few inferences about traits, context, or states. The predominance of inferences about only acts and effects may have been a function of the recall task. Or, it could have been a function of the text employed, a one-act play in which the reader must infer information about traits and goals not stated in the text. In response to a short story, seventh graders also tended to respond predominantly in terms of restatement of dialogue, with small percentage of inferences about types of speech acts.

However, in both studies, when students were asked probe questions, they were much more likely to make inferences about traits, goals, context, etc. This suggests that task influences inference. It also suggests that students, at least in their recall, focus on what they perceive to be essential or immediate concerns: inferring the nature of the acts and their effects on other characters.

The responses to probe questions asking students to explain acts were analyzed. In the analysis of the seventh grade data, judges separated out reasons stated in terms of characters' goals and then further divided those inferences into "long-range" vs. "short-range" goal inferences—long range inferences were defined as related to a character's overall objective, intention or goal. Most of the goal inferences were judged to be "short-range," suggesting that the seventh graders tended to link acts to characters' immediate intentions.

As students develop in their knowledge of literary and social conventions, they may be increasingly more able to link acts to long-range goals because they have the schema that allow them to make act/goal inferences. Readers who know the prototypical goal of the male suitor in a romance novel can readily infer the overall goal. Based on the assumption that the college-age subjects employed in the one-act play study would bring a stronger background of prior knowledge about conventions constituting marital relationships (the subject of the play), the college subjects' explanations for speech acts were compared with the high

school subjects' explanations. Using a procedure for sorting reasons according to short- vs. long-range goals (see Beach, 1979), it was found that the college students, on 12 out of 16 acts explained, made inferences judged to be more consistent with the characters' long-range goals, when compared to the tenth graders' inferences. For example, in the play, young newlyweds are constantly bickering, each accusation followed by a counter-charge. In explaining some of these acts, the college students were more likely to infer the groom's goal as asserting his control and the bride's counter-goal of resisting or testing out that authority, while the high school subjects were more likely to explain their acts in terms of immediate states or effects.

Further work is needed to refine this highly exploratory sorting methodology. This method does provide data on the content of the inferences, and the fact that subjects may cluster around certain inference types suggests that certain types of schema are generating similar or "conventional" responses.

By way of a summary, let me propose some topics deserving further investigation, noting the importance of research on the relationship of prior knowledge and inference for literature instruction.

Building on the "discourse processing/story grammar" research with elementary age students and the "response to literature" research of the past two decades, we need research focusing on secondary students' specific inference strategies employed during reading of literary texts. Using open-ended "thinking aloud" responses and responses to probe questions based on predetermined inference types, an investigator could examine the stages previously outlined: the movement from inferences about characters' acts to reasons for those acts (in terms of goals, traits, beliefs, contexts, states) to underlying assumptions linking acts to those other components. These assumptions could then be compared to data on subjects' knowledge of the subject matter or literary form of that

text. Investigators could also examine changes in students' perspectives or schema from initial prototypical perspectives to alterations of those perspectives during and after reading the text. Particular attention should be given to students' capacity to test out and adopt different or new perspectives as they move through the text.

In order to determine the relationship of prior knowledge and readers' responses, subjects from different age levels who presumably possess different degrees of prior knowledge of social and literary conventions would be chosen. Within age groups, information about subjects' prior knowledge would be ascertained.

However, ascertaining prior knowledge poses major problems of validity. Questions about a subject's theoretical knowledge of conventions may tap their "knowing-that" competence as opposed to their "knowing-how" competence. A subject may be able to define the characteristics of comic form, but may not be able to employ that knowledge in responding to comic texts. One option to determining theoretical knowledge is to provide subjects with brief descriptions of prototypical episodes and then examine variation in response within a group to determine degrees of "knowing-how" competence. Or subjects could be asked to compose narratives and their use of narrative devices could be used to determine knowledge of narrative conventions.

All of this raises the larger question: Is it possible to measure tacit knowledge? Or, from a different perspective, can one deduce competence from performance? These questions pose major, if not insurmountable methodological problems.

This theory and research on the relationship of prior knowledge and inference may prove to be useful for literature instruction in several ways. Students need to know how to use their prior knowledge in responding to texts. The

knowledge they bring to texts, as I have argued, is and must be prototypical knowledge. In reading a story such as Updike's well-known, "A Sense of Shelter," about a popular cheerleader and an unpopular studious admirer, students use knowledge of cheerleaders and academic grinds. In this case, students need to know that their knowledge is relevant, yet they must also know that their knowledge may conflict with the text; they need to be open to accepting information from the text. How do they learn this? It could be argued that they simply learn this by reading. However, the fact that students can discuss their responses in a class means that they are exposed to the inference strategies of other students, each of whom is bringing a different set of background experiences and knowledge.

Research on the influence of prior knowledge would also be useful in developing criteria for diagnosing and evaluating students' growth in a school's literature program. At present, a student's response to each separate text is assessed but often without consideration of the student's developing knowledge. By comparing responses over an entire year or years, a teacher, using descriptive criteria, could determine areas in which a student had or had not changed. Moreover, by pinpointing particular inference strategies which pose problems for a student (for example, inferring goals from acts), a teacher could then develop certain activities that would help that student improve in that area.

A model stressing the on-going, anticipatory nature of inference also has implications for secondary composition research and instruction. In making decisions at the prewriting and drafting stages, a writer needs to be able to define intentions in terms of the idea or point they want to communicate and how they want their reader to respond to the writing. Some research indicates that inexperienced writers have more difficulty than experienced writers in defining goals in terms of potential reader response (Flower and Harjes, 1979).

These inexperienced writers may need instruction in methods of anticipating reader response. Because students rarely receive a line-by-line response to their writing describing a reader's comprehension processes, they are often oblivious to the fact that a reader needs to be able to process their writing. For example, a teacher could indicate that a student created certain expectations by noting the student stated an opinion and that, as a reader, the teacher had expected some examples to support that opinion. From such feedback, a student then internalizes certain principles or conventions constituting discourse processing; for example, that if one gives an opinion, it is expected that that opinion be supported with examples.

Inexperienced writers also have difficulty in anticipating readers' own schema—those assumptions, beliefs, attitudes, questions a reader would bring to a certain topic. Knowing these potential schema, a writer could then determine methods for defining or addressing these matters. A writer could define a stance or position in order to help a reader identify their own stance. Having garnered the reader's identification, a writer may then attempt to convince him of the validity of that stance.

I cite these examples from writing instruction to re-emphasize the need to consider inference as part of both reception and production. It may be that instruction in reader-based heuristics in a composition class may enhance reading ability. Or, it may be the case that readers who can infer a writer's use of certain strategies and cues may be able to assess their writing more effectively than readers who cannot make those inferences. Research that considers both the productive and receptive aspects of discourse within subjects may provide support for these contentions.

Figure I

Discourse Conventions and Literary Inference

Using prior knowledge of:

1. Speech-act conventions:

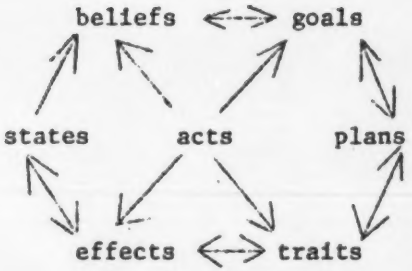
   a. conditions for asserting, requesting, questioning, promising

   b. Grice's Cooperative Principle maxims of Quantity, Quality, Relation, Manner

2. Social conventions/psychological laws
   conventions constituting appropriate performance and roles in trials, ceremonies, classrooms, etc. Conventions constituting behavior in certain historical periods

3. Literary conventions
   conventions constituting character roles and narrative patterns (comedy, mystery, adventure, heroes, side kicks, foils, etc.):
   awareness of author's intentions

Reader infers ("contextualizes"):



References

Applebee, A. The child's concept of story. Chicago: University of Chicago Press, 1978.

Austin, J. How to do things with words. J. Urmson (Ed.), Cambridge, Mass.: Harvard University Press, 1962.

Beach, R. Differences between high school and college students' inferences about literary dialogue. Paper presented at meeting of American Educational Research Association, San Francisco, 1979.

Flower, L. and Hayes, J. Process-based evaluation of writing. Paper presented at meeting of American Educational Research Association, San Francisco, 1979.

Labov, W. and Waletzky, J. Narrative analysis: oral versions of personal experience. In J. Helm (Ed.), Essays on the verbal and visual arts. Seattle, Washington: University of Washington Press, 1967, 12-44.

Labov, W. and Fanshel, D. Therapeutic discourse. New York: Academic Press, 1977.

Meyer, B. J. F. The organization of prose and its effect on memory. Amsterdam: North Holland Press, 1975.

Pichert, J. and Anderson, R. Taking different perspectives on a story. Center for the Study of Reading, Technical Report No. 14. Urbana: University of Illinois, 1976.

Pratt, M. Toward a speech act theory of literary discourse. Bloomington, Indiana: Indiana University Press, 1977.

Searle, J. Speech acts. Cambridge, England: Cambridge University Press, 1969.

Shaughnessy, M. Errors & Expectations. New York: Oxford University Press, 1977.

Stein, N. and Glenn, C. An analysis of story comprehension in elementary school children. In R. Freedle (Ed.), Discourse processing: multidisciplinary perspectives. Hillsdale, New Jersey: Erlbaum Press, 1977.

Shuy, R. What children's functional language can tell us about reading. In R. Beach and P. D. Pearson (Eds.), Perspectives on literacy. Urbana: National Council of Teachers of English, 1978.

Zimba, P. The effects of age and reading level on junior high students' short story inferences. Unpublished Master's thesis, University of Minnesota, 1979.

FUTURE ISSUES

In the first three issues of this monograph series, we focused on reviews of literature and specific research studies related to adolescents' reading. In this fourth monograph, we have departed from research per se to address a topic of immense concern to researchers and practitioners alike.

In subsequent issues, the next to be published in April, 1980, we intend to return to our original format of studies and reviews of literature. We welcome manuscripts for these future issues. We also welcome poignant, perceptive responses to any of the articles we have published, either in this issue or in previous issues.

It is our hope that we can provide a forum for educators to share research, "new" ideas, and/or reflections. It is to that end that our future issues will be addressed.

J.L.V.
P.L.A.
Editors